

**Alternative Element for Water Supply Reliability in the
Delta Vision Strategic Plan:
Extension of the Tehama-Colusa Canal to Water Users in the North Delta**

Tehama-Colusa Canal Authority

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Introduction

The Delta Vision Blue Ribbon Task Force adopted a vision for California's Delta in November 2007 and is now developing a strategic plan to implement that vision. To assist in developing the plan, the Blue Ribbon Task Force recently invited interested parties to propose elements for inclusion in the plan. This paper proposes one element for the plan with an emphasis on reliable water for California. The following pages describe the proposed project and discuss how the project builds upon the overall Vision.

Project Description

The Red Bluff Diversion Dam (RBDD), the Tehama-Colusa Canal, and the Corning Canal were authorized as part of the Sacramento Canals Unit of the Central Valley Project (CVP) to provide irrigation water in the Sacramento Valley in portions of Tehama, Glenn, Colusa and Yolo counties. The facilities allow the U.S. Bureau of Reclamation (Reclamation) to deliver water to member districts of the Tehama-Colusa Canal Authority (TCCA), amounting to over 150,000 acres of irrigated lands with over 300,000 acre-feet of water service contracts. The TC canal is a 111-mile long, concrete-lined structure starting at RBDD and ending approximately 2 miles south of Dunnigan.

The original plan for the TC Canal included a terminal reservoir of indeterminate size and/or further extension into Yolo County, possibly connecting to the Putah South Canal system. Full development of the system was shelved due to budgetary constraints during the Vietnam War. At its terminus, the canal is able to convey approximately 1,700 cfs. In recent years, TCCA has considered the extension of the TC Canal to serve additional areas in Yolo County and Solano County.

TCCA and Reclamation are in the process of finalizing the Environmental Impact Statement/Environmental Impact Report for a project to improve fish passage at RBDD and enhance water supply reliability by reducing or eliminating reliance on the diversion dam. The selected project will include construction of a pumping plant at the Mill Site with an initial installed capacity of 2,180 cfs and a footprint that will allow expansion to 2,500 cfs. If the canal were extended, it could serve additional users in the Sacramento Valley and could convey Sacramento River water intended for diversion within the north Delta, by diverting water at RBDD. Water deliveries would be conveyed through the existing TC Canal, a proposed canal segment connecting to the Winters Canal system, and a second new canal segment connecting the Winters Canal system to the Solano Division via the Putah South Canal system, including state water contractors currently served via the North Bay Aqueduct and the Barker Slough Pumping Plant. Figure 1 provides an illustration of one potential extension alignment. Existing and potential expansion of these systems would be considered as part of this proposed program. If extended, the canal system could serve new users such as the Yolo County Flood Control and Water Conservation District; northern entities that have plans for residential development outside of the legal Delta, such as Dunnigan and Arbuckle; and other water purveyors to the south, such as Solano Irrigation District and the cities of Vallejo and Fairfield.

In addition, the potential canal extension could supply water to the Davis-Woodland Water Supply Project (DWWSP). Proposed facilities of the DWWSP include a 51 mgd diversion/intake facility at river mile 70.5, a pipeline conveyance route to serve the communities of Woodland and Davis, and a water treatment plant. The canal extension could replace the proposed DWWSP's Sacramento River diversion with the existing TC Canal diversion at RBDD. Conveyance from the TC Canal extension would allow for gravity flow into

the proposed project's facilities. If the TC Canal were extended to serve this project, then the proposed new diversion facility, and the potential impacts to the Sacramento River and fishery resources, could be avoided.

The canal extension would add an element of flexibility to Delta operations and would increase water supply reliability for some in-Delta diverters by decreasing dependency on the current water quality constraints within the legal Delta (i.e., at the Barker Slough Pumping Plant). Management of the Delta is largely focused on the control of saltwater intrusion because naturally occurring contaminants (i.e., salinity, organic carbon, bromide) substantially degrade water quality for municipal and agricultural uses. Water quality in the Delta is a function of salinity and it is highly variable due to daily fluctuations of the tidal cycle and annual runoff characteristics. Sea level rise, the impacts of climate change, seismic risks, and levee failures all have the potential to bring the freshwater/saltwater interface farther upriver into the Delta resulting in substantial changes to Delta operations. Even under modest sea level rise and climate warming projections, extremely high seawater levels will likely be very common by the end of this century. Furthermore, a seismic event could cause extensive damage to Delta levees and result in substantial saltwater intrusion. Each of these factors has the potential to dramatically alter Bay-Delta conditions, increase constraints on management options, and decrease water supply reliability for Delta water users.

The most direct means of ensuring a supply of high quality water is to capture it during times when it is available, and at locations not impacted by the natural contaminants (i.e., upstream of the saltwater/freshwater interface, such as at RBDD). Water supply reliability can be addressed by having the physical means to convey and store the available quantities of high

quality water. The proposed canal extension would enable the conveyance of high quality water from the Sacramento River at RBDD to users in the northern Delta.

The proposed canal extension would increase flexibility in Delta operations through the ability to adapt north-of-Delta and in-Delta water diversions to changing conditions as understanding of the flow levels necessary to meet water supply and ecosystem objectives changes over time. Such supplies would also increase options available to meet ecosystem objectives by decreasing the necessity for potable water quality in the northern Delta, which would enable more natural patterns of water flow and salinity that are critical to the ecosystem. Conversely, depending on future operational objectives, the canal extension also could be used to directly deliver freshwater to the Delta for ecosystem management or salinity control.

Performance Measures

The proposed project can be broken down into two phases: Phase I would include stakeholder outreach, feasibility studies, environmental analysis, and preliminary design; Phase II would include final design, construction and operations. During the first phase, performance standards would be largely qualitative, and would include measures such as stakeholder interest, administrative assessment of applicability of governing laws and procedures (water quality regulations, water rights, endangered species, etc.), and the technical demonstration of physical and financial elements of the project. During the second phase, the performance of the project would be subject to more quantifiable measures. Performance standards could include the ability to manage flows in the Delta, the ability to provide high-quality water to municipal and agricultural users, and management of the freshwater/saltwater interface to vary in order to achieve ecosystem objectives in the Delta, some of which may be developed by the conclusion of Phase I.

Barriers to Success

There are many policies and programs governing actions in the Delta – including over 220 governmental agencies. Due to competing interests, this complex regulatory environment can present a barrier to regional cooperation and also can cause administrative divisions. Such conflicts often result in lengthy and unnecessary project delays. This potential barrier is a clear indicator of the need for clear, effective working relationships with federal, state, and local agencies and stakeholders. It is also an indicator of the need to articulate a clear description of the proposed vision for the northern Delta, particularly as it affects water supply and reliability. A general understanding of the likely management changes in the Delta and the physical manifestations of how these changes will affect water supply would help the various interests understand how near-term cooperation could provide tangible benefits.

Next Steps

The two main steps necessary to move forward with the potential canal extension are outreach to stakeholders and the completion of feasibility studies. Stakeholder outreach would be necessary to discuss project partnering, water allocations, and demand characteristics. Feasibility studies would be necessary to determine potential service to northern entities, such as Dunnigan, Arbuckle, Woodland, and Davis; the amount of existing in-Delta exporters that could instead obtain water from the canal, including riparian diverters; existing capacity in the Winters Canal and Putah South Canal; and potential canal alignments. It would also be important to determine which water users could be serviced by a canal extension beyond connection to the Putah South Canal system, such as Reclamation Districts in the northwestern Delta.

After determining the feasibility of the proposed canal extension, the next steps would include developing project funding, completing an environmental analysis, developing the

operations schedule and guidelines, developing the monitoring program, completing design of the canal, and constructing the canal. The timeline for the project would likely include two years for stakeholder outreach and completion of feasibility studies, two years for the environmental analysis and canal design, and four years for project construction. Overall project costs are speculative at this point of analysis, but stakeholder outreach intended to gauge interest in canal extension could be initiated for \$75,000. Full implementation of the project could run in excess of \$100,000,000.

The Twelve Integrated and Linked Recommendations

Of the twelve Integrated and Linked Recommendations for the overall Vision, seven recommendations are related to water supply (Recommendations 1, 4 through 9). Diversions for municipal and agricultural uses upstream and within the Delta affect the health of the Delta. As the overall Vision is achieved, it will be necessary to have the flexibility in Delta operations to meet water demands for the ecosystem and also for municipal and agricultural water users. As noted above, extension of the TC Canal would increase flexibility in Delta operations to meet water supply and ecosystem objectives for the Delta. As such, the potential project is consistent with Vision Recommendation 1, which emphasizes the co-equal goals of a healthy ecosystem and a reliable water supply.

The Delta provides drinking water for about 20 million people, making water quality, and the ability to adequately treat Delta water, a major concern. As California's population grows, increasing urban water needs will have to be met mainly by improving water management. Preventing contaminants (i.e., salinity, organic carbon, and bromide) from entering waterways will be the most efficient and sustainable strategy to protect Delta water quality for drinking water uses because some constituents (i.e., bromide and organic carbon)

cannot be removed without producing harmful disinfection byproducts. The proposed canal extension could increase the efficiency of Delta drinking water uses because municipal users, such as Vacaville and Fairfield, that depend wholly or partially on Sacramento River diversions within the Delta could obtain their drinking water from the diversion at RBDD without risk to water quality. The potential project is consistent with Vision Recommendation 4, which emphasizes the efficient management of California's water supply for California's future population.

The Vision recommends that strategic investments be made in the Delta to improve the conservation, efficiency, and sustainable use of water (Recommendation 6); to increase flexibility to be able to change patterns and timing of Delta diversions (Recommendation 7); to have new facilities to better manage water resources (Recommendation 8); and to be able to improve water circulation and quality (Recommendation 9). As described in the Project Description, above, the proposed canal extension is consistent with these Recommendations.

Despite many studies and varied policies and programs, a strong sense of uncertainty still characterizes the understanding of the Delta. Recognizing the uncertainty in knowledge and about outcomes of policies and programs has very specific implications for future Delta management. It is vital to create a flexible system that can adapt to an ever-changing environment. The proposed canal extension would add one element of flexibility to Delta operations. It would also provide knowledge that would be important to other potential conveyance alternatives for the Delta. When paired with other projects that are consistent with the overall Vision, this project would help create a resilient and successful system for water users -- ecological, municipal, and agricultural -- for generations to come.

Figure 1
Potential Canal
Extension Alignment

